

# Investment-cash flow sensitivity and financial constraints: Indonesia evidence

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**Abstract.** Capital market imperfection has made the firms rely on internal cash flow as an investment funding (Investment-cash flow sensitivity). Using data from a sample of 139 non-financial firms listed in Indonesia Stock Exchange from 2010 to 2017, this paper examines whether Investment-cash flow sensitivity (ICFS) could be found in Indonesia and to test by how much ICFS in financially constrained and unconstrained firms are. The method used in this study is panel data set using E-views 9 Software to estimate investment-cash flow sensitivity. In addition, we construct financial constraints measure by extracting Principal Component Analysis with three different measures, the probability of paying a dividend, bond ratings, and firm size. The result shows that cash flow is positive and statistically significant to investment. Furthermore, Investment-cash flow sensitivity is found to be higher for financially constrained firms. To conclude, this paper provides a supporting evidence the precense of ICFS in Indonesia.

## 1. Introduction

In a perfect capital market, investment and financing decision are irrelevant. Modigliani Miller (1958) states that there are no difference between the cost of internal and external financing on a perfect capital market because external funds are the perfect substitutes for internal funds. However, the 21st century financial crisis due to asymmetric information has affected the perfectness of capital markets and raised concerns on corporate's investment funding decision.

Investment in capital expenditure plays a significant role in executing corporate's business projects. Every investment decisions cannot be separated from financing decisions. The company's funding sources come from internal and external. Internal funds are a source of funding derived from cash flows generated from operational activities. If the internal funding is insufficient, the company will cover the shortfall through external funding consisting of debt financing and equity financing. Debt financing refers to borrowing funds that must be repaid along with the interest, such as bank loan and bond. Debt is a financing source that is considered relatively "cheap" compared to equity financing because of the tax shield facility. Equity financing is the last alternative sources of fund through offering company ownership to the public (IPO) in the form of common stock and preferred stock. Companies often use a combination of these two types of funding in financing their business activities. The more choices of funding sources company has, the more choices or financial flexibility for company to invest in fixed assets.

The first research was conducted by Fazzari, Hubbard, and Peterson (FHP, 1988) using cash flow as a internal funding and investment has found that cash flow has a positive influence on investment (investment-cash flow sensitivity) and cash flow (if constraints) will have an important role in the company's capital expenditure decisions. They concluded that companies with financial constraints indicated as a lower dividend payer would have a higher sensitivity of investment cash flows. However, Chen and Chen (2012) has found that investment-cash flow sensitivity has declined over time.

Therefore, this study is conducted to provide the evidence of investment-cash flow sensitivity in Indonesia. Another contribution of this research is the usage of Principal Component Analysis to generate the financial constraint measure. We use probability of paying dividend, bond rating, and firm size as a proxy of financial constraints in order to get universal measure .

## **2. Theoretical review and hypotheses development**

Miller and Modigliani (1958) states that in a perfect market (no transaction costs, bankruptcy, and taxes), the company's funding and investment decisions will be irrelevant. In fact, companies have limited access to external funding in conducting business activities. The existence of barriers (frictions) in the capital market can cause financial constraints which limit the ability of companies to invest (Cao & Leung, 2016). The next section will explain the financing and investment theory in detail.

### *2.1. Pecking Order Theory*

Pecking Order Theory explains the company's sequence of financing. Pecking Order Theory states that companies have a preference in the use of funds. This theory explains that companies will prioritize internal funds rather than external funds in funding activities (the order of risk). The company will only use external funds if the internal funds is insufficient. These external funding sources could be in the form of bank loans, bonds, and equity issuance.

### *2.2. Asymmetric Information*

One of the causes of market imperfections is asymmetry information. Asymmetry information occurs when a party has information that is not the same as the other party, in this case the company as a debtor and investor as a creditor. Management has more complete and detailed information about the condition of the company while outside parties have limited access to investment opportunities and various company risks. As a result, investors will value the company not as it should be (Akerlof, 1970). Creditors need a compensation for capital that costs higher than the costs of other internal funds (Lemmon & Zender, 2016). As the costs go higher, companies will prefer to use internal fund (cash flow) to finance their investment. Investment funding that is more focused on the use of cash flow is called investment-cash flow sensitivity (ICFS).

In addition, Myers (1984) argue that the existence of information asymmetry in the market causes companies to face higher external financing constraints. Thus, the greater the information asymmetry, the greater the level of the company's financial constraints in accessing external funds. Therefore, financially constrained firms will be more dependent on the use of cash flow to finance the investment. On the other hand, companies that do not face high information costs (financial unconstrained firms), they are more likely to have access to the "cheaper" external fund. As a result, financially unconstrained firms will have the flexibility of funding so that they will be less dependent on internal cash (cash flow). Consequently, investment-cash flow sensitivity will be higher in financial constraints than in unconstrained firms.

Based on theories above, the following two hypothesis is tested:

H<sub>1</sub>: The impact of internal cash flow on capital expenditure is statistically significant and positive.

H<sub>1</sub> tests for the investment-cash flow sensitivity. The significant effect of H<sub>1</sub> means that capital expenditure is sensitive to cash flow. To compare the level of ICFS in financially constrained and unconstrained firms, the following hypothesis is build:

H<sub>2</sub>: Financially constrained firms have higher investment-cash flow sensitivity than financially unconstrained firms.

## **3. Research data and methodology**

### *3.1 Data and methodology*

The population used in this research is 301 of non-financial firms listed on Indonesia Stock Exchange from 2010 to 2017, so there are 2408 observations in total. Purposive sampling was done as a method

to select only the samples that match the criteria, that is the availability of data, financial reports and firms' growth in total assets with no more than 100%. Based on the criterions, there are 139 firms covering 8 years used in this research. Hence, there are 1112 observations covered in this research. All data in this study are mainly obtained from companies' financial reports and *Bloomberg*.

### 3.2 Variables measurement

The variables used in the equation:

**Table 1:** Variable definitions

Variables	Definition	Measure
Capital Expenditure	The use of corporate's fund to finance fixed asset (property, plant, and equipment) that has economic benefit more than one year	Capital expenditures per one year lagged total assets
Cash Flow	The source of internal funds resulted from corporate's operating activities	Net income before extraordinary items plus depreciation and amortization per one year lagged total assets

#### 3.2.1 Financial constraints

To generate a general measure of financial constraints measure, a company's financial constraints are measured in three different measures using Principal Component Analysis, namely:

##### 3.2.1.1 Probability of paying dividend

Logit models based on Denis and Osobov (2008) estimation is used in determining the probability of paying dividend

$$\text{Ln}\left(\frac{\text{Pred}_{div}}{1 - \text{Pred}_{div}}\right) = \beta + \beta_1(V_t/A_t) + \beta_2(dA_t/A_t) + \beta_3(E_t/A_t) + \beta_4(RE_t/BE_t) + \beta_5(A_t) + \varepsilon_i \quad (1)$$

The higher the probability of a company in paying dividends, the company is relatively unconstrained (Denis & Osobov, 2008).

##### 3.2.1.2 Bond ratings

Companies that do not have a bond rating are considered financially constrained (Farre-Mensa & Ljungqvist, 2013) and companies that have a bond rating are considered financially unconstrained and coded as 1 and vice versa.

##### 3.2.1.3 Firm size

The smaller the size of the company indicates that the company is new and young so that it is vulnerable to market imperfection. Therefore, the size of the company will determine the financial constraints of a company.

$$\text{Firm size} = \text{Natural log of total assets} \quad (2)$$

### 3.3 Research model

A research model based from the paper of Fazzari *et al.* (1988) was adopted, where cash flow is the only independent variable used in this study. Two hypothesis are being tested to see the significant effect of ICFS and to compare ICFS in financial constraints and unconstraints firms using data panel. First hypothesis:

$$\text{capex}_{it} = \varphi_{it} + \varphi_1 CF_{it} + \varepsilon_{it} \quad (3)$$

Second hypothesis:

$$\text{Financial constraints: capex}_{it} = \alpha_{it} + \alpha_1 CF_{it} + \varepsilon_{it} \quad (4)$$

$$\text{Financial unconstraints: } capex_{it} = \beta + \beta_1 CF_{it} + \varepsilon_{it} \quad (5)$$

Where:

$\varphi, \alpha, \beta$	: Constant	$i$	: Number of cross sections
$\varphi_1, \alpha_1, \beta_1$	: Coefficient	$t$	: Number of time series
$capex$	: Capital Expenditure	$\varepsilon$	: Error

## 4. Empirical findings

### 4.1 Principal Component Analysis

**Tabel 2:** Principal component analysis

Eigenvalues			
Number	Value	Proportion	
1	1.370881	0.4570	
2	0.955178	0.3184	
3	0.673941	0.2246	
Eigenvectors (loadings):			
Variable	PC 1	PC 2	PC 3
DRATE	0.560899	-0.616228	0.552861
LNTA	0.683693	-0.031799	-0.729077
PRED_DIV	0.466858	0.786926	0.403475

Table 2 shows the result of principal component analysis. The first principal component has an eigenvalue of 1.370881 and explain 45.70% of the total variation. The first principal component with eigenvalue value above one will be extracted to get financial constraints measure (*fin\_const*). Then, to classify financially constrained and unconstrained firms, for each year, all observations are multiplied by negative one and then sorted into median based on the level of financial constraints measure. If an observation *fin\_const* is greater than the median, it will be categorized as financial unconstraints, and vice versa.

### 4.2 Descriptive analysis

**Table 3.** Descriptive statistics for financially unconstrained and constrained firms

Variable	Financially unconstrained firms		Financially constrained firms	
	Mean	SD	Mean	SD
Capex	0.0735	0.0653	0.0467	0.0586
CF	0.1781	0.1290	0.0875	0.0867
Fin Const	-0.9221	0.9738	0.9221	0.5008

We compare the descriptive statistics between financial constraints and unconstraints firms in table 2. Financial constraints firms are indicated to have a higher average of financial constraint measure because the lower probability of paying dividend, lower bond rating, and smaller firms size, the more constraints the companies are. As shown in the table, financial unconstraints firms have an average higher level of capital expenditure and cash flow than constraints firms. It is because unconstraints firms have easier access to funding sources that enable them to invest more.

### 4.3 Regression results

**Tabel 4.** Panel data regression results

Variable	(1) ICFS	(2) Financially Constrained	(3) Financially Unconstrained
CF	0.1577*	0.2268*	0.11.01*

Constant	0.0392	0.0285	0.0556
Observations	1112	556	556

**Notes:** \*statistically significant at the 1 per cent level

Firstly, the 1112 observations was regressed to test the first hypothesis. The results in table 4 column (1) provides empirical result that cash flow is positive and statistically significant at a level of 1% to capital expenditure. The estimated result shows that, Indonesia nonfinancial firms will increase 0.1577 units of its investment in capital expenditure for extra unit of cash flow. Therefore, the result supports our first hypothesis. We then examine whether financially constrained firms have higher ICFS by dividing the full sample into two groups according to median value of financial constraints measure. The results in column (2) and (3) show that ICFS is found higher in financially constrained than unconstrained firms. Financial constraints firms which is lower in probability of paying dividend, lower bond rating, and smaller firms size have ICFS of 22.68% which is about 2.06 times greater than financial unconstrained firms. The results are in harmony with FHP (1988) findings where financial constraints firms will depend their investment on internal cash flow more heavily due to costly external financing.

## 5. Conclusion and Suggestion

This research was done to 139 samples of Indonesia nonfinancial firms listed on Indonesia Stock Exchange from 2010 – 2017 aims to give a supporting evidence about ICFS in Indonesia. Firstly, it is concluded that positive sensitivity of investment-cash flows is a signal indicating non-financial firms in Indonesia face difficulties in accessing external funds; therefore cash flow is used to finance its investment. Secondly, financially constrained firms have higher ICFS than unconstrained firms. It means that constrained firms face higher external financing cost and will use their internal cash flow to finance its capital expenditure. Furthermore, this study does not include the relationship of financial constraints to ICFS. Future study can address to financial constraints that strengthen or weaken the effect of cash flow to capital expenditure.

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